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<110> Abe, Yuki
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<141> 2001-04-17

<150> JP 2000-116591

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acaaatgaac ctgacatctt gaccttttga tatagctgtt ggaagcgctt gaccgtctcc 33420
tggacatcac tcggtctgtt gggaaaatta tgctttccct gaaactcgag tacatctgca 33480
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cgaccgtgaa gatgcagtgt cggcacgttg attattagct tgctgtcgtc gtcttgccgc 33600
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ctcattttcg gaaaccatgg cagttttccc atttgcgtgt gatggagcag caaagtggcg 33720
accaatgcgc cctcagagaa ggccactatg ccgacaatgg gtgcctgtgg gttagttata 33780

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 gcatatacga attcaaactc gtttttcaac gccacgcgca gttagagat ctggacgcgg 34020
 aatatggctg ctgagcaccg ggcaccgtgg atgcataaga gagcttttct cggtttgctt 34080
 ggcgagaaat ctgtaatcct cgctggactc attttctctt gtggtgtgag ctgtgacttc 34140
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 atc 34203

<210> 3

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
 which has a DNA sequence deduced from the amino
 acid sequence of PKS of *Aspergillus flavus*.

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3

gayacngcnt gyasttc

17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of Aspergillus flavus.

<220>

<221> modified_base

<222> (3)..(3)

<223> i

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>

<221> modified_base

<222> (15)..(15)

<223> i

<400> 4,

tcnccnknrc wgtgncc

17

<210> 5

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 5

gcatgttcaa ttgctctc

19

<210> 6

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 6

ctggatcaga cttttctgc

19

<210> 7

<211> 18

<212> DNA

<213> Penicillium citrinum

<400> 7
gtcgcagtag catgggcc 18

<210> 8
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 8
gtcagagtga tgctcttctc 20

<210> 9
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 9
gttgagagga ttgtgagggc 20

<210> 10
<211> 19
<212> DNA
<213> *Penicillium citrinum*

<400> 10
ttgcttgtgt tggattgtc 19

<210> 11
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 11
catggtactc tcgcccgttc 20

<210> 12
<211> 19
<212> DNA
<213> *Penicillium citrinum*

<400> 12
ctccccagta cgtaagctc 19

<210> 13
<211> 21
<212> DNA
<213> *Penicillium citrinum*

<400> 13
ccataatgag tgtgactggt c 21

<210> 14
<211> 19
<212> DNA
<213> *Penicillium citrinum*

<400> 14
gaacatctgc atccccgtc 19

<210> 15
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 15
ggaaggcaaa gaaagtgtac 20

<210> 16
<211> 21
<212> DNA
<213> *Penicillium citrinum*

<400> 16
agattcattg ctgttggcat c 21

<210> 17
<211> 722
<212> DNA
<213> *Penicillium citrinum*

<400> 17
ggccacgcgt cgactagtac gggggggggg gggggggggg gcttgttcgc tcagagattc 60

aactctgcga ttctgtttaa tcccaatcct atcgcccaaa aacaggatca gcagttatgg 120

atcaagccaa ctatccaaac gagccaattg tggtagtggg aagcggttgt cggtttccag 180

gtggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga 240

ccaagatccc taaggagaga tttagcgtcg atacatttta cagccccgat ggcactcacc 300

ccgggcgcac gaacgcaccc tttagcatact tgctgcagga ggaatctacgc gggtttgatg 360

cctctttctt caacatccaa gctggagagg ccgaaacgat tgaccacacag caaaggctgc 420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag 480

gacctctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc 540

gtgaattgga tagtattcct acatactctg ccacgggggt agctgtcagt gtggcctcca 600
accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta 660
gttcatectt agctgccgtg catctggccg tccaacagct tagaacgggc gagagtacca 720
tg 722

<210> 18
<211> 760
<212> DNA
<213> *Penicillium citrinum*

<400> 18
ggccacgcgt cgactagtac gggggggggg gggggggggg gactatcaac ggttttatca 60
ccaggcgac tgatatatca gtcaatgaaa caacgttga atgaacaata cccccgccgt 120
aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggetcgg cttgctctaa 180
cacatccacg ccattgccca tagttggaat eggatgtcga ttgctggag atgcaacgag 240
tccacagaag ctttgggaaa tggttgaaag aggaggcagt gcctgggtcta aggtcccctc 300
ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccacca 360
cgtaaaggt ggacacttca tcgacgagga tctgtctta ttgacgccg cgttcttcaa 420
catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggttatgc ttgaggtggt 480
ctacgaatcg ctggagagtg ccggtatcac catcgatggt atggcaggct ctaatacgtc 540
ggtgtttggg ggtgtcatgt accacgacta tcaggattcg ctcaatcgtg accccgagac 600

agttccgcgt tatttcataa ctggcaactc aggaacaatg ctitcgaacc ggatatcaca 660
 cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gccigttega cgacattgac 720
 cgcactgcac ttggcgtgcc agagcttacg tactggggag 760

<210> 19
 <211> 773
 <212> DNA
 <213> *Penicillium citrinum*

<400> 19
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 agtgctctcg gccacaaaat ccagaagca ttagtgctgt tattegatta taaaccgtcg 120
 cagcgtcttc attctctcgt cttctctctt tccactggg gtgcataggt cctatctgtc 180
 tcacgcaatg ctcgccagg tttctctgac cgtcgaatcg taccaatggg tatcgacccc 240
 tcaagccctt gtggcggteg cagtgttct tagtctcatc gccctaccgtt tgcgggggcg 300
 ccagtcgaa ctgcaagtct ataatccaa aaaatggtgg gatttgacga ccatgagggc 360
 taggcaggac ttcgatacgt atggccgag ctggatcgaa gcttggttct cgaaaaacga 420
 caagccctcg cgcttcattg ttgattcgg ctattgcacc atctcccat cgtccatggc 480
 cgacgagttt cggaataatc aagatatgtg catgtacaag ttttggcgg atgactttca 540
 ctctcatctc cctggattcg acgggttcaa ggaaatctgc caggatgcac atcttgtcaa 600
 caaagttgtt ttgaaccagt taaaaacca agccccaag tacacaaagc catggctac 660
 cttggccgac gctactattg ccaagttgtt cggtaaaagc gaggagtggc aaaccgcacc 720

tgtctattcc aatggattgg accttgtcac acgaacagtc acactcatta tgg 773

<210> 20

<211> 527

<212> DNA

<213> *Penicillium citrinum*

<400> 20

ggccacgcgt cgactagtac gggggggggg gtacctagga actgttcagt tgccctccc 60

aaccccttgg gccgaacaac ctctctccaa tctacgacgg cagattatac ctaggcgcct 120

aaccgattag gttgctcatt cgattttgga gagactacct agctataggt accactccaa 180

gctgtagcac agacctttca gcatggtcgc ttctgtgcta cctctctgct ttctcggtag 240

ggaatcaatg aatcagcagc accctctacg ctctgggaaat cgggcatiga cctccacact 300

ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatagctat 360

tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaa 420

cgttgataaa gcagaatggg gctcttttgt cgaaggaagt cgaagcttga tcaccggccc 480

acagaatggc tggaagtggc agagcttcga cggggatgca gatgttc 527

<210> 21

<211> 522

<212> DNA

<213> *Penicillium citrinum*

<400> 21

ggccacgcgt cgactagtac gggggggggg gggggggggg ggatccatca atctgacttc 60

aggctagcgg accttaacga aacaacgaga gcgagatcat tcatacacca aaacacaggt	120
actatagaag cgccgcgcag tagagattca caccgccct tgaagcaaaa gtcggaagga	180
attgcgcgat gtcagaacct ctacccccta aagaagggga accaaggcca cagaaggaag	240
aaagtcacaaa tgacacgctc gaagcgactg agtccaagtc ccagcacatc acaggcctca	300
agctcgggct ggtgggttgc tcaattactt tcgtagcatt ttgatgctc cttgatatgt	360
ccattatcgt caggccaatc ccacatatca caagcgagtt ccactctctg aacgatgtag	420
ggtgggtacgg cagtgcattat cttctggcta actgtgctct ccagccctg gccggtaaat	480
tgtatacact cttgggcttg aagtacactt tctttgcctt cc	522

<210> 22

<211> 541

<212> DNA

<213> *Penicillium citrinum*

<400> 22

ggccacgcgt cgactagtac gggggggggg ggctcacctc acattatttg atcttaatcc	60
aataattatg tccctgccgc atgcaacgat tccgacgaac ctacgccgtc gcgcgtttcg	120
acgctcatgt gaccgggtgc atgcacaaaa gctcaaatgt accggtagca atgccaattt	180
agtccgtgct cagtgtcaac gttgtcagca agccggatta aggtgtgtgt acagcgaaag	240
gctacccaag cgcaatttac ataaagaagc cgcagctgga actacaagag ccacagaaac	300
ctcacaccg atgaccgcga catcttctac ggtcttctca tcattggcag agactcctcc	360

accttactgc tcaccaccta cgcataatgg cacctcggca ctcaaggaaa cattatcaga	420
accatcagcg gcaaccctgc aattctatga tacatcaatc aactttgatg atcccagatc	480
gtttcccggc ggctggcctc agccaaatac atttcgagac gatgccaaca gcaatgaatc	540
t	541

<210> 23
 <211> 20
 <212> DNA
 <213> *Penicillium citrinum*

<400> 23	
atcataccat cttcaacaac	20

<210> 24
 <211> 20
 <212> DNA
 <213> *Penicillium citrinum*

<400> 24	
gctagaatag gttacaagcc	20

<210> 25
 <211> 20
 <212> DNA
 <213> *Penicillium citrinum*

<400> 25	
acattgccag gcacccagac	20

<210> 26

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 26

caacgcccaa gctgccaatc

20

<210> 27

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 27

gtcttttctt actatctacc

20

<210> 28

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 28

ctttccagc tgctactatc

20

<210> 29

<211> 1524

<212> DNA

<213> *Penicillium citrinum*

<400> 29

aactggaaga attcgcgccc gcaggaattt ttttttttt tttttttcaa cgaaggtaga

60

agtaattttg acaaagatac aagacgaatt cgctatttgt agatgaatat gcgtgtgtca

120

attgaagccg aattcaggat agatttgcca tctgctctat tgccaatttc taatccatct	180
ttatcatgaa caacactcaa accacacatc tgaattcacg gcgctgaacg atctaggcca	240
acttcagagc cgggttcacg gagaacatag tgaggattga agaaaagtgg tctacaaagg	300
cctgagcgtg ctgaggcca tacagcgagc tctgaagttt gacatgaatg agtgggtcct	360
tggtagggtc atcccacatc tcgagaacga tgcataagg agtgcgctca cgggaagcga	420
gaacactcgt cattttggca ttgccaattg agccactctc cgcttgacct tgcttgtaat	480
caaagacagc ctggaacaag ggggcgtgtg tctgagttt gggttctcgc cctgaggtag	540
ggagattcag gcctagacag tcgaggatga cgccatacgg caccgcgcgc tgttgcatgg	600
cctcacgcac actgtccttg gtggctacaa ggtgctcgcc gaatgtcttg ctgccgacga	660
actcatcaaa gcgcagggga agcacgttag cgaaaaagcc catcgccgaa atttcttcca	720
tggtggatcg gttggtttcg gcgagggcca tggttatgtc tttgctgccg gtaagacgcg	780
ccaacaaaac gtggtaggcg gccaggtaga actgcatggg ggttgccttg tgcttgccgc	840
tccgctcttt gattcggaag gcgaccatgg gatctaaacg agcaattgct tcatactgct	900
gccacgtgaa tggctgtatt tgcgtgct ctgaattggc agcagggtca ttgatcagat	960
tcatgatggg aagcacggtt ggcgcatag acgagacttt gctatgcatg gacttccaga	1020
acgcgatatc gtccccatt cgccatttt ccaggttttc ccgctgttgg acggctagat	1080
cagagaattg ggtcgatggt cgtgcattt tcaccccgct glaaatctgc ccgatctcat	1140
tgaacagggt ttctgttgtt gagccatcac caactaatct gtggtagccg attaccaaca	1200

ggtggtcac tgtgccccag tagaaatcaa cgagtcctgag agtgtcacct gtggagatgc 1260
 tatagtttgt cttctcgagt ttccgggtact ctctctctgc ctccgcagcg ttgttcacct 1320
 gaacaaagtg cactctgttc tccgggttct tgagaaccac ttggacggga ccatttaaatt 1380
 cgctgctata gtcacgcca gtaacaaagc acgtacggaa gatctcgtga cggcgcaatg 1440
 aggccttcag agcccgctc aaccggctga ggtcaatggt acccttcattg aacatgccaa 1500
 tagtgttggt gaagatggta tgat 1524

<210> 30

<211> 784

<212> DNA

<213> *Penicillium citrinum*

<400> 30

aactggaaga attcggggcc gcaggaattt ttttttttt ttttttttc tttgttgctt 60
 ctcagggccca ctgtaatggt atttcaggta tctctattta ctgctatcca gaagtcaggc 120
 attaaatagt caggtctcagc ccaggctcga ttcagattgg attcaggett cagaccatgg 180
 ccgctatgct ccttcgtact atacctcgt cgagctatac ccgcttggcc agacaaaagg 240
 cttcactgaa ccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga 300
 tgggtgtacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc 360
 agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg 420
 aggacatgtc gtcttctgcc agaccaaaca ttgcattcag cttttccgtc attgctttga 480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttgggcc cgcacgccat 540
 ctggtccttt tttatgcgaa gagacaaagg attggtctgc atgaaggact tggcgggtatt 600
 taagtccac aaaccgctgt tcctgtatcc agtttgcctc ggtccagtga gcacccgggg 660
 atgtgttgat tcctgtaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca 720
 ggattgcctt ctccaacaca tccatgacgt ccttttcatg cataggcttg taacctattc 780
 tagc 784

<210> 31

<211> 764

<212> DNA

<213> *Penicillium citrinum*

<400> 31

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttc gaataaaatg 60
 cgttttattt tactaaccta ctgactaat acagcaccta gtttctctgg gacggaaacc 120
 attggaataa gcctggggac ggatgcatat ttgttttagt ttgcgtgta tatcttagca 180
 ccggtcatga gggagcggga tgcctcgtt gcgcggcgt accatgagct ttgtggttgg 240
 atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctctg gtacaggctt 300
 cacatcatc tgaatcagta tatgagcgag gagaatcttg atttccttcg aggccaagaa 360
 ccgcccggga caagcgctg ggttccagcc gaagccgatg tgatcacctg tggattctc 420
 caattgagcg gtgaaggcct tgtctggatc ctgcgcatg cgcataaatc ggtagggatc 480
 ataattttcg gggttttccc acacatcagg gttgttcatg cggctctgcag ccacagcggc 540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcgggtact 600
gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag 660
gagcttcagc ttgaacagag aggcaggcgt ccagccccct tctccgatta cagtgcggat 720
ctcttggcgg agaggctgaa taaggtctgg gtgcctggca atgt 764

<210> 32

<211> 765

<212> DNA

<213> *Penicillium citrinum*

<400> 32

aactggaaga attcgcgccc gcaggaattt ttttttttt tttttctgg aaaaggacca 60
tctctttata tattcttctt cctactact tgcctcgtaa atttcaacaa catataaaca 120
tgagataccc ttcttgccg ttcactctac cacctgcctg tctcattgca ttgtgctttt 180
gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact 240
ggagggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagcccga 300
tcagtagctg cagcactcgg cctcagtga ttgttaggaa cagggactgt cctggttccg 360
cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc 420
atgtgcgct tgaccaggtg accggcggt agggcagcac atagcgagag ctccccagcc 480
aaaacagcgc ttccgatgat gcgcgaagt tgacgtgcat tctaccggg agtggtcggg 540
tgtgatccgc ggacaccaag catgtcaagc attgcgcct ggggctccag aatcgtacca 600

ccgccaacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga	660
agattgtica tgagagtgat gcagttagcg ctctccacaa ctgcgccgg atcctgacct	720
gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg	765

<210> 33

<211> 802

<212> DNA

<213> *Penicillium citrinum*

<400> 33

aactggaaga attcgcggcc gcaggaattt ttttttttt tttttataga atctttgaaa	60
tcgacattaa ttaagtatgt ggagattctt tgtggaggca cggtaatgtg tctatctagc	120
aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc	180
gccatcccat tccaaaggca aacacaaacg tgcacgccgt agctcccact gctaagtaaa	240
aagtatgata aacggcgaga ctgtaagctt ttacaacccc tggaagggtta ttcttgctga	300
ccacatctct gaagccagtc gccctgtctg ccgtcacggc ctgcgtgtcg acagtgggcg	360
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agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttggt	480
cgggcgaaag cgtgcttttg atggcgatga taggcgtttg catgccacaa ccacgaccga	540
agccccgat aaattggtac atgaccatt tcacagtiga tgtatggggc tggaagggtg	600
ataccagacc tgcgcctatg gcgacgagaa cagcgtgcc tagggcccaa ggcaaatagt	660
atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc	720

caggcaacat gtacacacca ctacgtgtgg gagaacatc ctacacagcc tggaagtaga 780

tcggtagata gtaggaaaag ac 802

<210> 34

<211> 562

<212> DNA

<213> *Penicillium citrinum*

<400> 34

aactggaaga attcgcggcc gcaggaattt ttttttttt ttttttttac taagcaatat 60

tgtgtttctt cgctaattgc aatatttctt tatagcaacg tcgcaacaca tttatcgtct 120

tcctgaggc ctttgttgac ttgggtcttt cgtctccggc ttcgtcactc caaagcacag 180

ataggagacg agaggccggc gttatggttt tattttcagc gcccaaggatt tgccacgatg 240

tgcttggcat atctgatagg actagacgaa tagatgccgc agccccgtgc tctgtgcta 300

tccccaaagc agtctcaatc ccaactcaata gtcgaaggct tacacgcaat gtcgtgcatg 360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat 420

tagagtgaat cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag 480

accagtacca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcacacct 540

cggatagtag cagctgggaa ag 562

<210> 35

<211> 26

<212> DNA

<213> Penicillium citrinum

<400> 35

gttaacatgt cagaacctct accccc

26

<210> 36

<211> 27

<212> DNA

<213> Penicillium citrinum

<400> 36

aatattcaa gcatcagtct caggcac

27

<210> 37

<211> 1662

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(1662)

<400> 37

atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag

48

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys

1

5

10

15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag

96

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln

20

25

30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc

144

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe

35

40

45

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc	192
Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile	
50 55 60	
cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac	240
Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr	
65 70 75 80	
ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt	288
Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly	
85 90 95	
aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc	336
Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu	
100 105 110	
tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc	384
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser	
115 120 125	
acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt	432
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly	
130 135 140	
ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac	480
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His	
145 150 155 160	
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc	528
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala	
165 170 175	
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act	576
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr	
180 185 190	

tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca	624
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala	
195 200 205	
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac	672
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp	
210 215 220	
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt	720
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu	
225 230 235 240	
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc	768
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr	
245 250 255	
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga	816
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg	
260 265 270	
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att	864
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile	
275 280 285	
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att	912
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile	
290 295 300	
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt	960
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe	
305 310 315 320	
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg	1008
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro	
325 330 335	

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg	1056
Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val	
340 345 350	
tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct	1104
Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser	
355 360 365	
ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc	1152
Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly	
370 375 380	
agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag	1200
Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln	
385 390 395 400	
ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc	1248
Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly	
405 410 415	
ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc	1296
Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser	
420 425 430	
acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt	1344
Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe	
435 440 445	
gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc	1392
Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val	
450 455 460	
ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc	1440
Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val	
465 470 475 480	

gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg 1488
 Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
 485 490 495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc 1536
 Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
 500 505 510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt 1584
 Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
 515 520 525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac 1632
 Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
 530 535 540

acc cgg gct gtg cct gag act gat gct tga 1662
 Thr Arg Ala Val Pro Glu Thr Asp Ala
 545 550

<210> 38

<211> 553

<212> PRT

<213> Penicillium citrinum

<400> 38

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
 1 5 10 15

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
 20 25 30

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
35 40 45

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
50 55 60

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65 70 75 80

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
85 90 95

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
100 105 110

Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
115 120 125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
130 135 140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145 150 155 160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser
355 360 365

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly
370 375 380

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln
385 390 395 400

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly
405 410 415

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser
420 425 430

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
435 440 445

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
450 455 460

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
465 470 475 480

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
485 490 495

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
500 505 510

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
515 520 525

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
530 535 540

Thr Arg Ala Val Pro Glu Thr Asp Ala
545 550

<210> 39

<211> 31

<212> DNA

<213> *Penicillium citrinum*

<400> 39

ggatccatgt ccctgccgca tgcaacgatt c

31

<210> 40

<211> 30

<212> DNA

<213> *Penicillium citrinum*

<400> 40

ggatccctaa gcaatattgt gttttcttcgc

30

<210> 41

<211> 1380

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg

48

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala

1

5

10

15

ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc

96

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr

20

25

30

ggc agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa

144

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln

35

40

45

gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta

192

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu

50

55

60

cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa

240

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln

65

70

75

80

cct atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act	288
Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr	
85 90 95	
cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc	336
Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu	
100 105 110	
aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat	384
Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Glu Phe Tyr Asp	
115 120 125	
aca tca atc aac ttt gat gat ccc gag tgc ttt ccc ggc ggc tgg cct	432
Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro	
130 135 140	
cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg	480
Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly	
145 150 155 160	
ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg	528
Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala	
165 170 175	
cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca	576
Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser	
180 185 190	
tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt	624
Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser	
195 200 205	
ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act	672
Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr	
210 215 220	

gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt 720
Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225 230 235 240

acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac 816
Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
260 265 270

tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt 912
Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
290 295 300

act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct 1008
Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
325 330 335

gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg 1104
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
355 360 365

agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg 1152
 Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
 370 375 380

gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa 1200
 Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
 385 390 395 400

atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta 1248
 Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
 405 410 415

tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca 1296
 Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
 420 425 430

aag gcc tca ggg aag acg ata aat atg ttg cga cgt tgc tat aag gaa 1344
 Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
 435 440 445

ata ttc gca tta gcg aag aaa cac aat att gct tag 1380
 Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
 450 455

<210> 42

<211> 459

<212> PRT

<213> *Penicillium citrinum*

<400> 42

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
 1 5 10 15

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
20 25 30

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
35 40 45

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
50 55 60

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65 70 75 80

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
85 90 95

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
100 105 110

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
115 120 125

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
130 135 140

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145 150 155 160

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
165 170 175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
180 185 190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
195 200 205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
210 215 220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225 230 235 240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
245 250 255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
260 265 270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
275 280 285

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
290 295 300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305 310 315 320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
325 330 335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
340 345 350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala

450

455

<210> 43

<211> 9099

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(9099)

<400> 43

atg gat caa gcc aac tat cca aac gag cca att gtg gta gtg gga agc 48

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser

1

5

10

15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag 96

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu

20

25

30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga 144

Leu Leu Lys Glu Pro Arg Asp Val Cln Thr Lys Ile Pro Lys Glu Arg

35

40

45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc 192

Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg

50

55

60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt 240

Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe

65

70

75

80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac 288

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp	
85 90 95	
cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac	336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn	
100 105 110	
gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac	384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr	
115 120 125	
gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg	432
Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu	
130 135 140	
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc	480
Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala	
145 150 155 160	
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg	528
Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr	
165 170 175	
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc	576
Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val	
180 185 190	
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg	624
Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala	
195 200 205	
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac	672
Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn	
210 215 220	
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat	720

Met	Leu	Ser	Pro	Asn	Gly	Arg	Ser	Arg	Met	Trp	Asp	Ala	Ala	Ala	Asp	
225					230				235						240	
gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg																768
Gly	Tyr	Ala	Arg	Gly	Glu	Gly	Val	Cys	Ser	Ile	Val	Leu	Lys	Thr	Leu	
				245				250						255		
agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag																816
Ser	Gln	Ala	Leu	Arg	Asp	Gly	Asp	Ser	Ile	Glu	Cys	Val	Ile	Arg	Glu	
			260					265						270		
acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac																864
Thr	Gly	Ile	Asn	Gln	Asp	Gly	Arg	Thr	Thr	Gly	Ile	Thr	Met	Pro	Asn	
		275					280						285			
cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt																912
His	Ser	Ala	Gln	Glu	Ala	Leu	Ile	Arg	Ala	Thr	Tyr	Ala	Lys	Ala	Gly	
		290					295						300			
ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat																960
Leu	Asp	Ile	Thr	Asn	Pro	Gln	Glu	Arg	Cys	Gln	Phe	Phe	Glu	Ala	His	
305						310					315				320	
gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca																1008
Gly	Thr	Gly	Thr	Pro	Ala	Gly	Asp	Pro	Gln	Glu	Ala	Glu	Ala	Ile	Ala	
				325					330					335		
aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag																1056
Thr	Ala	Phe	Phe	Gly	His	Lys	Asp	Gly	Thr	Ile	Asp	Ser	Asp	Gly	Glu	
			340						345					350		
aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg																1104
Lys	Asp	Glu	Leu	Phe	Val	Gly	Ser	Ile	Lys	Thr	Val	Leu	Gly	His	Thr	
		355						360						365		
gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta																1152

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val	
370	375
380	
cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc	1200
Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro	
385	390
395	400
cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca	1248
Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr	
405	410
415	
gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat	1296
Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn	
420	425
430	
tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat	1344
Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr	
435	440
445	
atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca	1392
Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser	
450	455
460	
gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag	1440
Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln	
465	470
475	480
cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg	1488
Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr	
485	490
495	
cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa	1536
His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys	
500	505
510	
cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa	1584

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu	
515 520 525	
gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc	1632
Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val	
530 535 540	
acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc	1680
Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val	
545 550 555 560	
ttt act ggc caa ggt gca cag tgg cgg ggc atg ctg aag aag ctc atg	1728
Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met	
565 570 575	
gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca	1776
Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser	
580 585 590	
ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac	1824
Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp	
595 600 605	
cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc	1872
Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe	
610 615 620	
tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc	1920
Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu	
625 630 635 640	
gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt	1968
Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly	
645 650 655	
gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct	2016

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala	
660 665 670	
atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct	2064
Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser	
675 680 685	
tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac	2112
Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr	
690 695 700	
gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc	2160
Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val	
705 710 715 720	
tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac	2208
Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp	
725 730 735	
atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act	2256
Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr	
740 745 750	
ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg	2304
Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met	
755 760 765	
cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt	2352
His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys	
770 775 780	
gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc	2400
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala	
785 790 795 800	
gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct	2448

Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala	
805 810 815	
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tgc cag gct gtg	2496
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val	
820 825 830	
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att	2544
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile	
835 840 845	
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat	2592
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp	
850 855 860	
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac	2640
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn	
865 870 875 880	
gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag	2688
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu	
885 890 895	
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc	2736
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val	
900 905 910	
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac	2784
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr	
915 920 925	
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc	2832
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg	
930 935 940	
cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct	2880

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser	
945 950 955 960	
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc	2928
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro	
965 970 975	
cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg	2976
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val	
980 985 990	
ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag	3024
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys	
995 1000 1005	
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg	3069
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu	
1010 1015 1020	
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc	3114
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr	
1025 1030 1035	
tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat	3159
Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp	
1040 1045 1050	
gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg	3204
Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu	
1055 1060 1065	
gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc	3249
Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val	
1070 1075 1080	
ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca	3294

Ile Thr	Leu Gly Glu Ala Ser	Pro Ser Ser Gln Leu	Leu Pro Pro	
1085	1090	1095		
cct gag	gaa gag tac ccc cag	atg aac aat gtc aac	atc gat ttc	3339
Pro Glu	Glu Glu Tyr Pro Gln	Met Asn Asn Val Asn	Ile Asp Phe	
1100	1105	1110		
ttc tat	cgg gaa ctt gac ctc	ctt ggg tat gac tac	agc aaa gac	3384
Phe Tyr	Arg Glu Leu Asp Leu	Leu Gly Tyr Asp Tyr	Ser Lys Asp	
1115	1120	1125		
ttc cgt	cgt ttg cag acc atg	aga agg gcc gac tcc	aaa gct agc	3429
Phe Arg	Arg Leu Gln Thr Met	Arg Arg Ala Asp Ser	Lys Ala Ser	
1130	1135	1140		
ggc acc	ttg gct ttc ctt cca	ctt aag gat gaa ttg	cgc aat gag	3474
Gly Thr	Leu Ala Phe Leu Pro	Leu Lys Asp Glu Leu	Arg Asn Glu	
1145	1150	1155		
ccc ctc	ttg ctc cac cca gcg	ccc ctg gac atc gcg	ttc cag act	3519
Pro Leu	Leu Leu His Pro Ala	Pro Leu Asp Ile Ala	Phe Gln Thr	
1160	1165	1170		
gtc att	gga gcg tat tcc tct	cca gga gat cgt cgc	cta cgc tca	3564
Val Ile	Gly Ala Tyr Ser Ser	Pro Gly Asp Arg Arg	Leu Arg Ser	
1175	1180	1185		
ttg tac	gtg cct act cac gtt	gac aga gtg act ctg	att cca tcg	3609
Leu Tyr	Val Pro Thr His Val	Asp Arg Val Thr Leu	Ile Pro Ser	
1190	1195	1200		
ctc tgt	ata tcg gcg ggt aat	tct ggt gaa acc gag	ctt gcg ttt	3654
Leu Cys	Ile Ser Ala Gly Asn	Ser Gly Glu Thr Glu	Leu Ala Phe	
1205	1210	1215		
gac aca	atc aac aca cac gac	aag ggt gat ttc ctg	agc ggc gac	3699

Asp Thr	Ile Asn Thr His Asp	Lys Gly Asp Phe Leu	Ser Gly Asp	
1220	1225	1230		
atc acg	gtg tac gat tgc acc	aag aca acg ctt ttc	caa gtt gat	3744
Ile Thr	Val Tyr Asp Ser Thr	Lys Thr Thr Leu Phe	Gln Val Asp	
1235	1240	1245		
aac att	gtc ttt aag cct ttc	tct ccc ccg act gct	tcg acc gac	3789
Asn Ile	Val Phe Lys Pro Phe	Ser Pro Pro Thr Ala	Ser Thr Asp	
1250	1255	1260		
cac cga	atc ttc gca aag tgg	gtc tgg gga ccc ctc	acg ccc gaa	3834
His Arg	Ile Phe Ala Lys Trp	Val Trp Gly Pro Leu	Thr Pro Glu	
1265	1270	1275		
aaa ctg	ctg gag gac cct gcg	acg ttg atc ata gct	cgg gac aag	3879
Lys Leu	Leu Glu Asp Pro Ala	Thr Leu Ile Ile Ala	Arg Asp Lys	
1280	1285	1290		
gag gac	att ctg acc atc gag	cga atc gtt tac ttc	tac atc aaa	3924
Glu Asp	Ile Leu Thr Ile Glu	Arg Ile Val Tyr Phe	Tyr Ile Lys	
1295	1300	1305		
tcc ttc	cta gcc cag ata acc	ccc gac gac cgt caa	aat gcc gac	3969
Ser Phe	Leu Ala Gln Ile Thr	Pro Asp Asp Arg Gln	Asn Ala Asp	
1310	1315	1320		
ctc cat	tcc cag aag tac att	gaa tgg tgt gac cag	gtt cag gcc	4014
Leu His	Ser Gln Lys Tyr Ile	Glu Trp Cys Asp Gln	Val Gln Ala	
1325	1330	1335		
gat gct	cgg gct ggc cac cat	cag tgg tac cag gag	tct tgg gag	4059
Asp Ala	Arg Ala Gly His His	Gln Trp Tyr Gln Glu	Ser Trp Glu	
1340	1345	1350		
gag gac	act tct gtt cac att	gag caa atg tgt gaa	agc aac tcg	4104

Glu Asp Thr Ser Val His Ile	Glu Gln Met Cys Glu Ser Asn Ser	
1355	1360	1365
tcc cac cca cat gtg cgc ctg	atc caa agg gta ggc	aaa gaa tta 4149
Ser His Pro His Val Arg Leu	Ile Gln Arg Val Gly Lys Glu Leu	
1370	1375	1380
att tca att gtt cgc ggg aac	ggg gat cct ttg gat	atc atg aac 4194
Ile Ser Ile Val Arg Gly Asn	Gly Asp Pro Leu Asp Ile Met Asn	
1385	1390	1395
cgc gat ggg ttg ttc acc gag	tac tat acc aac aag	ctc gcc ttt 4239
Arg Asp Gly Leu Phe Thr Glu	Tyr Tyr Thr Asn Lys Leu Ala Phe	
1400	1405	1410
ggc tca gca ata cac gtc gtt	cag gat ctg gtt agc	caa att gct 4284
Gly Ser Ala Ile His Val Val	Gln Asp Leu Val Ser Gln Ile Ala	
1415	1420	1425
cat cgc tac caa tcc att gat	atc ctt gag atc ggc	ttg ggt aca 4329
His Arg Tyr Gln Ser Ile Asp	Ile Leu Glu Ile Gly Leu Gly Thr	
1430	1435	1440
ggc atc gcc acg aag cgc gtt	ctt gca tca cct caa	ctt ggt ttc 4374
Gly Ile Ala Thr Lys Arg Val	Leu Ala Ser Pro Gln Leu Gly Phe	
1445	1450	1455
aac agt tac act tgc act gac	atc tcg gcg gat gtt	att ggc aag 4419
Asn Ser Tyr Thr Cys Thr Asp	Ile Ser Ala Asp Val Ile Gly Lys	
1460	1465	1470
gcc cgt gaa caa ctt tcc gaa	ttc gac ggt ctc atg	cag ttt gag 4464
Ala Arg Glu Gln Leu Ser Glu	Phe Asp Gly Leu Met Gln Phe Glu	
1475	1480	1485
gca cta gac atc aac aga agc	cca gca gag caa gga	ttc aag cct 4509

Ala Leu Asp Ile Asn Arg Ser	Pro Ala Glu Gln Gly	Phe Lys Pro	
1490	1495	1500	
cac tcc tac gat ctg att att	gca tcc gat gtc ctc	cat gcc agc	4554
His Ser Tyr Asp Leu Ile Ile	Ala Ser Asp Val Leu	His Ala Ser	
1505	1510	1515	
tcc aac ttc gag gaa aaa ttg	gct cac ata agg tcc	ttg ctc aag	4599
Ser Asn Phe Glu Glu Lys Leu	Ala His Ile Arg Ser	Leu Leu Lys	
1520	1525	1530	
ccg ggt ggt cac ttg gtt act	ttc ggg gtc acc cat	cgc gag cct	4644
Pro Gly Gly His Leu Val Thr	Phe Gly Val Thr His	Arg Glu Pro	
1535	1540	1545	
gct cgc ctc gcc ttc atc tct	ggg ctt ttc gct gat	cga tgg act	4689
Ala Arg Leu Ala Phe Ile Ser	Gly Leu Phe Ala Asp	Arg Trp Thr	
1550	1555	1560	
gga gaa gac gaa act cgt gct	ttg agt gcc tcg ggg	tcc gtt gac	4734
Gly Glu Asp Glu Thr Arg Ala	Leu Ser Ala Ser Gly	Ser Val Asp	
1565	1570	1575	
caa tgg gag cat acc ctc aag	aga gtt ggg ttc tct	ggc gtc gat	4779
Gln Trp Glu His Thr Leu Lys	Arg Val Gly Phe Ser	Gly Val Asp	
1580	1585	1590	
agt cgg aca ctt gat cga gag	gat gat ttg atc ccg	tct gtc ttc	4824
Ser Arg Thr Leu Asp Arg Glu	Asp Asp Leu Ile Pro	Ser Val Phe	
1595	1600	1605	
agt aca cat gct gtg gat gcc	acc gtt gag cgt ttg	rat gat cca	4869
Ser Thr His Ala Val Asp Ala	Thr Val Glu Arg Leu	Tyr Asp Pro	
1610	1615	1620	
ctt tct gct cca ttg aag gac	tca tac ccg cca tta	gtg gtt atc	4914

Leu Ser	Ala Pro	Leu Lys	Asp	Ser Tyr	Pro Pro	Leu	Val Val	Ile	
1625			1630			1635			
ggt ggc	gaa tcg	aca aaa	acc	gaa cgc	att ttg	aac	gac atg	aaa	4959
Gly Gly	Glu Ser	Thr Lys	Thr	Glu Arg	Ile Leu	Asn	Asp Met	Lys	
1640			1645			1650			
gct gcc	cta ccg	cat aga	cac	atc cac	tcc gtc	aag	cgg ctg	gaa	5004
Ala Ala	Leu Pro	His Arg	His	Ile His	Ser Val	Lys	Arg Leu	Glu	
1655			1660			1665			
agt gtt	ctc gac	gac ccg	gcc	ttg cag	cct aag	tcg	act ttt	gtc	5049
Ser Val	Leu Asp	Asp Pro	Ala	Leu Gln	Pro Lys	Ser	Thr Phe	Val	
1670			1675			1680			
atc ctc	tcg gaa	ctt gat	gat	gaa gtg	ttt tgc	aac	ctt gaa	gag	5094
Ile Leu	Ser Glu	Leu Asp	Asp	Glu Val	Phe Cys	Asn	Leu Glu	Glu	
1685			1690			1695			
gac aag	ttt gag	gca gtc	aag	tct ctt	ctc ttc	tac	gcc gga	cgc	5139
Asp Lys	Phe Glu	Ala Val	Lys	Ser Leu	Leu Phe	Tyr	Ala Gly	Arg	
1700			1705			1710			
atg atg	tgg ctg	aca gag	aat	gcc tgg	att gat	cat	ccc cac	cag	5184
Met Met	Trp Leu	Thr Glu	Asn	Ala Trp	Ile Asp	His	Pro His	Gln	
1715			1720			1725			
gcc agc	acc atc	gga atg	ttg	agg aca	atc aag	ctc	gag aac	cct	5229
Ala Ser	Thr Ile	Gly Met	Leu	Arg Thr	Ile Lys	Leu	Glu Asn	Pro	
1730			1735			1740			
gac ttg	gga acg	cac gtc	ttc	gat gtc	gat act	gtg	gag aac	cta	5274
Asp Leu	Gly Thr	His Val	Phe	Asp Val	Asp Thr	Val	Glu Asn	Leu	
1745			1750			1755			
gac acc	aaa ttc	ttc gtt	gag	caa ctt	ttg cgc	ttc	gag gag	agc	5319

Asp Thr	Lys Phe Phe Val Glu	Gln Leu Leu Arg Phe	Glu Glu Ser	
1760		1765	1770	
gat gat	cag ctt ttg gaa tca	ata aca tgg act cat	gag ccc gaa	5364
Asp Asp	Gln Leu Leu Glu Ser	Ile Thr Trp Thr His	Glu Pro Glu	
1775		1780	1785	
gtg tac	tgg tgc aag ggt cgt	gcc tgg gtc cct cgt	ttg aag cag	5409
Val Tyr	Trp Cys Lys Gly Arg	Ala Trp Val Pro Arg	Leu Lys Gln	
1790		1795	1800	
gat att	gct agg aac gac cgt	atg aac tcg tct cgt	cgt cca att	5454
Asp Ile	Ala Arg Asn Asp Arg	Met Asn Ser Ser Arg	Arg Pro Ile	
1805		1810	1815	
ttc ggt	aac ttt aat tcg tcc	aag acg gcc att gca	ctg aaa gag	5499
Phe Gly	Asn Phe Asn Ser Ser	Lys Thr Ala Ile Ala	Leu Lys Glu	
1820		1825	1830	
gcg agg	gga gca tcc tca tcg	atg tac tat ctt gag	tca acc gag	5544
Ala Arg	Gly Ala Ser Ser Ser	Met Tyr Tyr Leu Glu	Ser Thr Glu	
1835		1840	1845	
acg tgt	gat tcg tta gaa gac	gct cgt cat gct gga	aaa gca act	5589
Thr Cys	Asp Ser Leu Glu Asp	Ala Arg His Ala Gly	Lys Ala Thr	
1850		1855	1860	
gtt cgt	gtt cgc tac gct ctt	ccc cag gca att cgc	gtg ggc cat	5634
Val Arg	Val Arg Tyr Ala Leu	Pro Gln Ala Ile Arg	Val Gly His	
1865		1870	1875	
ctc gga	tac ttc cat gtc gtg	cag ggc agt att ctg	gag aat aca	5679
Leu Gly	Tyr Phe His Val Val	Gln Gly Ser Ile Leu	Glu Asn Thr	
1880		1885	1890	
tgt gag	gtg cct gta gtc gcc	ctg gct gag aag aat	gga tct ata	5724

Cys Glu	Val Pro Val Val Ala	Leu Ala Glu Lys Asn	Gly Ser Ile	
1895		1900	1905	
ctg cat	gta ccg aga aac tac	atg cat agt ctg ccc	gat aac atg	5769
Leu His	Val Pro Arg Asn Tyr	Met His Ser Leu Pro	Asp Asn Met	
1910		1915	1920	
gcg gaa	ggc gag gat agt tcc	ttc ttg ttg tcc aca	gct gca gcc	5814
Ala Glu	Gly Glu Asp Ser Ser	Phe Leu Leu Ser Thr	Ala Ala Ala	
1925		1930	1935	
ctc ctt	gcc gaa aca att ctc	tct agc gct cag tcc	ttt ggc tct	5859
Leu Leu	Ala Glu Thr Ile Leu	Ser Ser Ala Gln Ser	Phe Gly Ser	
1940		1945	1950	
gat gca	tca att ctg att atg	gag ccc cca atc ttc	tgc gtc aaa	5904
Asp Ala	Ser Ile Leu Ile Met	Glu Pro Pro Ile Phe	Cys Val Lys	
1955		1960	1965	
gca att	ctg gag tcg gcc aaa	acc tac ggt gtt cag	gtt cat ttg	5949
Ala Ile	Leu Glu Ser Ala Lys	Thr Tyr Gly Val Gln	Val His Leu	
1970		1975	1980	
gca aca	act ctg tcc gac gtc	aaa act att ccg gct	cct tgg atc	5994
Ala Thr	Thr Leu Ser Asp Val	Lys Thr Ile Pro Ala	Pro Trp Ile	
1985		1990	1995	
cga tta	cat gcc aag gaa acc	gac gct cgg ctg aaa	cac agc ctg	6039
Arg Leu	His Ala Lys Glu Thr	Asp Ala Arg Leu Lys	His Ser Leu	
2000		2005	2010	
ccg aca	aac atg atg gca ttc	ttt gac ttg tct acc	gac cgg act	6084
Pro Thr	Asn Met Met Ala Phe	Phe Asp Leu Ser Thr	Asp Arg Thr	
2015		2020	2025	
gct gcc	ggg ata acc aac cgt	ttg gcc aag ttg cta	cca ccc agt	6129

Ala Ala Gly Ile Thr Asn Arg	Leu Ala Lys Leu Leu	Pro Pro Ser	
2030	2035	2040	
tgc ttc atg tac agt ggt gac	tat ctt atc cga agt	aca gct tcc	6174
Cys Phe Met Tyr Ser Gly Asp	Tyr Leu Ile Arg Ser	Thr Ala Ser	
2045	2050	2055	
aca tac aaa gtt agt cat gtt	gag gat att cca atc	ctc gag cac	6219
Thr Tyr Lys Val Ser His Val	Glu Asp Ile Pro Ile	Leu Glu His	
2060	2065	2070	
tct gtg gca atg gca aaa aat	acc gtc tct gcg tcg	act gtc gac	6264
Ser Val Ala Met Ala Lys Asn	Thr Val Ser Ala Ser	Thr Val Asp	
2075	2080	2085	
gac act gag aaa gtt att aca	gcc aca caa att ctc	ttg cct ggt	6309
Asp Thr Glu Lys Val Ile Thr	Ala Thr Gln Ile Leu	Leu Pro Gly	
2090	2095	2100	
cag ctc tct gtc aac cac aat	gac caa cgc ttc aat	ctg gcc acc	6354
Gln Leu Ser Val Asn His Asn	Asp Gln Arg Phe Asn	Leu Ala Thr	
2105	2110	2115	
gtc atc gac tgg aag gaa aat	gag gtg tcc gct agg	att tgc ccc	6399
Val Ile Asp Trp Lys Glu Asn	Glu Val Ser Ala Arg	Ile Cys Pro	
2120	2125	2130	
atc gac tct ggt aac tta ttt	tcc aac aag aag acg	tat ttg ctt	6444
Ile Asp Ser Gly Asn Leu Phe	Ser Asn Lys Lys Thr	Tyr Leu Leu	
2135	2140	2145	
gtt ggt ctt acc ggg gac ctt	ggg cgc tct ctc tgt	cgc tgg atg	6489
Val Gly Leu Thr Gly Asp Leu	Gly Arg Ser Leu Cys	Arg Trp Met	
2150	2155	2160	
atc ttg cat ggc gcc cgc cat	gtt gtg ctc act agc	cgg aac cct	6534

Ile Leu His Gly Ala Arg His	Val Val Leu Thr Ser	Arg Asn Pro	
2165	2170	2175	
cga ctt gat ccc aaa tgg atc	gcc aac atg gag gca	ctt ggt ggt	6579
Arg Leu Asp Pro Lys Trp Ile	Ala Asn Met Glu Ala	Leu Gly Gly	
2180	2185	2190	
gac atc acc gtt ctg tca atg	gat gtt gcc aat gag	gat tca gtc	6624
Asp Ile Thr Val Leu Ser Met	Asp Val Ala Asn Glu	Asp Ser Val	
2195	2200	2205	
gat gct ggc ctt ggc aag ctt	gtc gat atg aag ttg	cca cct gtt	6669
Asp Ala Gly Leu Gly Lys Leu	Val Asp Met Lys Leu	Pro Pro Val	
2210	2215	2220	
gcc ggc atc gcg ttc ggg cct	ttg gtg ctg cag gat	gtc atg ctg	6714
Ala Gly Ile Ala Phe Gly Pro	Leu Val Leu Gln Asp	Val Met Leu	
2225	2230	2235	
aag aac atg gac cac cag atg	atg gac atg gtg ttg	aag ccc aag	6759
Lys Asn Met Asp His Gln Met	Met Asp Met Val Leu	Lys Pro Lys	
2240	2245	2250	
gta caa gga gca cgc att ctt	cat gaa cgg ttc tcc	gaa cag acg	6804
Val Gln Gly Ala Arg Ile Leu	His Glu Arg Phe Ser	Glu Gln Thr	
2255	2260	2265	
ggc agc aag gcg ctc gac ttc	ttc atc atg ttt tgc	tcc att gtt	6849
Gly Ser Lys Ala Leu Asp Phe	Phe Ile Met Phe Ser	Ser Ile Val	
2270	2275	2280	
gca gtt att ggc aat cct ggc	cag tcc aac tat ggc	gct gcg aat	6894
Ala Val Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly	Ala Ala Asn	
2285	2290	2295	
gcc tac cta cag gct ctg gcc	cag caa cgg tgc gcc	aga gga ttg	6939

Ala Tyr	Leu Gln Ala Leu Ala	Gln Gln Arg Cys Ala	Arg Gly Leu	
2300	2305	2310		
gcg gga	tca acc atc gat att	ggg gcc gtt tac ggt	gta ggg ttt	6984
Ala Gly	Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly	Val Gly Phe	
2315	2320	2325		
gtc acg	agg gcc gag atg gag	gag gac ttt gat gct	atc cgt ttc	7029
Val Thr	Arg Ala Glu Met Glu	Glu Asp Phe Asp Ala	Ile Arg Phe	
2330	2335	2340		
atg ttt	gac tca gtt gaa gag	cat gag ctg cac acg	ctt ttc gcc	7074
Met Phe	Asp Ser Val Glu Glu	His Glu Leu His Thr	Leu Phe Ala	
2345	2350	2355		
gaa gcg	gtc gtg tct gac cag	cgt gcc cgg cag caa	cca cag cgc	7119
Glu Ala	Val Val Ser Asp Gln	Arg Ala Arg Gln Gln	Pro Gln Arg	
2360	2365	2370		
aag acg	gtc att gac atg gcg	gac ctt gag ctt acc	acg ggt atc	7164
Lys Thr	Val Ile Asp Met Ala	Asp Leu Glu Leu Thr	Thr Gly Ile	
2375	2380	2385		
cca gat	ctt gac cct gcg ctt	caa gat cga att att	tac ttc aac	7209
Pro Asp	Leu Asp Pro Ala Leu	Gln Asp Arg Ile Ile	Tyr Phe Asn	
2390	2395	2400		
gac cct	cgi ttc gga aac ttc	aaa att ccc ggt caa	cgc gga gac	7254
Asp Pro	Arg Phe Gly Asn Phe	Lys Ile Pro Gly Gln	Arg Gly Asp	
2405	2410	2415		
ggg ggc	gac aat gga tca ggg	tct aaa ggc tcc att	gcc gac cag	7299
Gly Gly	Asp Asn Gly Ser Gly	Ser Lys Gly Ser Ile	Ala Asp Gln	
2420	2425	2430		
ctc aaa	caa gca aca act tta	gac caa gtt cgg caa	atc gtg att	7344

Leu Lys	Gln Ala Thr Thr Leu	Asp Gln Val Arg Gln	Ile Val Ile	
2435	2440	2445		
gat ggt	cta tct gag aaa ctc	cgt gtt acc ctc caa	gtt tcg gac	7389
Asp Gly	Leu Ser Glu Lys Leu	Arg Val Thr Leu Gln	Val Ser Asp	
2450	2455	2460		
ggg gag	agc gtg gac cca acc	att cct ctc att gat	caa ggt gtc	7434
Gly Glu	Ser Val Asp Pro Thr	Ile Pro Leu Ile Asp	Gln Gly Val	
2465	2470	2475		
gac tcc	ttg ggt gca gtg act	gtc ggc tca tgg ttc	tca aag caa	7479
Asp Ser	Leu Gly Ala Val Thr	Val Gly Ser Trp Phe	Ser Lys Gln	
2480	2485	2490		
ctc tac	ctt gac ctc cca ctc	ttg agg gta ctt ggc	ggt gct tct	7524
Leu Tyr	Leu Asp Leu Pro Leu	Leu Arg Val Leu Gly	Gly Ala Ser	
2495	2500	2505		
gtc gct	gat ctt gcc gac gac	gcg gcc acc cga ctc	cca gct aca	7569
Val Ala	Asp Leu Ala Asp Asp	Ala Ala Thr Arg Leu	Pro Ala Thr	
2510	2515	2520		
tcc att	ccg ctg ctg ttg caa	att ggt gat tcc acg	gga acc tcg	7614
Ser Ile	Pro Leu Leu Leu Gln	Ile Gly Asp Ser Thr	Gly Thr Ser	
2525	2530	2535		
gac agc	ggg gct tct ccg aca	cca aca gac agc cat	gat gaa gca	7659
Asp Ser	Gly Ala Ser Pro Thr	Pro Thr Asp Ser His	Asp Glu Ala	
2540	2545	2550		
agc tct	gct acc agc aca gat	gcg tcg tca gcc gaa	gag gat gaa	7704
Ser Ser	Ala Thr Ser Thr Asp	Ala Ser Ser Ala Glu	Glu Asp Glu	
2555	2560	2565		
gag caa	gag gac gat aat gag	cag gga ggc cgt aag	att ctt cgt	7749

Glu Gln	Glu Asp Asp Asn Glu	Gln Gly Gly Arg Lys	Ile Leu Arg	
2570	2575	2580		
cgc gag	agg ttg tcc ctt ggc	cag gag tat tcc tgg	agg cag caa	7794
Arg Glu	Arg Leu Ser Leu Gly	Gln Glu Tyr Ser Trp	Arg Gln Gln	
2585	2590	2595		
caa atg	gta aaa gat cat acc	atc ttc aac aac act	att ggc atg	7839
Gln Met	Val Lys Asp His Thr	Ile Phe Asn Asn Thr	Ile Gly Met	
2600	2605	2610		
ttc atg	aag ggt acc att gac	ctc gac cgg ttg agg	cgg gct ctg	7884
Phe Met	Lys Gly Thr Ile Asp	Leu Asp Arg Leu Arg	Arg Ala Leu	
2615	2620	2625		
aaa gcc	tca ttg cgc cgt cac	gag atc ttc cgt acg	tgc ttt gtt	7929
Lys Ala	Ser Leu Arg Arg His	Glu Ile Phe Arg Thr	Cys Phe Val	
2630	2635	2640		
act ggc	gat gac tat agc agc	gat tta aat ggt ccc	gtc caa gtg	7974
Thr Gly	Asp Asp Tyr Ser Ser	Asp Leu Asn Gly Pro	Val Gln Val	
2645	2650	2655		
gtt ctc	aag aac ccg gag aac	aga gtg cac ttt gtt	cag gtg aac	8019
Val Leu	Lys Asn Pro Glu Asn	Arg Val His Phe Val	Gln Val Asn	
2660	2665	2670		
aac gct	gcg gag gca gag gaa	gag tac cgg aaa ctc	gag aag aca	8064
Asn Ala	Ala Glu Ala Glu Glu	Glu Tyr Arg Lys Leu	Glu Lys Thr	
2675	2680	2685		
aac tat	agc atc tcc aca ggt	gac act ctc aga ctc	gtt gat ttc	8109
Asn Tyr	Ser Ile Ser Thr Gly	Asp Thr Leu Arg Leu	Val Asp Phe	
2690	2695	2700		
tac tgg	ggc aca gat gac cac	ctg ttg gta atc ggc	tac cac aga	8154

Tyr Trp Gly Thr Asp Asp His	Leu Leu Val Ile Gly Tyr His Arg	
2705	2710	2715
tta gtt ggt gat ggc tca aca	aca gaa aac ctg ttc aat gag atc	8199
Leu Val Gly Asp Gly Ser Thr	Thr Glu Asn Leu Phe Asn Glu Ile	
2720	2725	2730
ggg cag att tac agc ggg gtg	aaa atg cag cga cca tcg acc caa	8244
Gly Gln Ile Tyr Ser Gly Val	Lys Met Gln Arg Pro Ser Thr Gln	
2735	2740	2745
ttc tct gat cta gcc gtc caa	cag cgg gaa aac ctg gaa aat ggg	8289
Phe Ser Asp Leu Ala Val Gln	Gln Arg Glu Asn Leu Glu Asn Gly	
2750	2755	2760
cga atg ggg gac gat atc gcg	ttc tgg aag tcc atg cat agc aaa	8334
Arg Met Gly Asp Asp Ile Ala	Phe Trp Lys Ser Met His Ser Lys	
2765	2770	2775
gtc tcg tca tct gcg cca acc	gtg ctt ccc atc atg aat ctg atc	8379
Val Ser Ser Ser Ala Pro Thr	Val Leu Pro Ile Met Asn Leu Ile	
2780	2785	2790
aat gac cct gct gcc aat tca	gag cag cag caa ata cag cca ttc	8424
Asn Asp Pro Ala Ala Asn Ser	Glu Gln Gln Gln Ile Gln Pro Phe	
2795	2800	2805
acg tgg cag cag tat gaa gca	att gct cgt tta gat ccc atg gtc	8469
Thr Trp Gln Gln Tyr Glu Ala	Ile Ala Arg Leu Asp Pro Met Val	
2810	2815	2820
gcc ttc cga atc aaa gag cgg	agc cgc aag cac aag gca acc ccc	8514
Ala Phe Arg Ile Lys Glu Arg	Ser Arg Lys His Lys Ala Thr Pro	
2825	2830	2835
atg cag ttc tac ctg gcc gcc	tac cac gtt ttg ttg gcg cgt ctt	8559

Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu	
2840 2845 2850	
acc ggc agc aaa gac ata acc atc ggc ctc gcc gaa acc aac cga	8604
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg	
2855 2860 2865	
tcc acc atg gaa gaa att tcg gcg atg ggc ttt ttc gct aac gtg	8649
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val	
2870 2875 2880	
ctt ccc ctg cgc ttt gat gag ttc gtc ggc agc aag aca ttc ggc	8694
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly	
2885 2890 2895	
gag cac ctt gta gcc acc aag gac agt gtg cgt gag gcc atg caa	8739
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln	
2900 2905 2910	
cac gcg cgg gtg ccg tat ggc gtc atc ctc gac tgt cta ggc ctg	8784
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu	
2915 2920 2925	
aat ctc cct acc tca ggc gag gaa ccc aag act cag aca cac gcc	8829
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala	
2930 2935 2940	
ccc ttg ttc cag gct gtc ttt gat tac aag cag ggt caa gcg gag	8874
Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu	
2945 2950 2955	
agt ggc tca att ggc aat gcc aaa atg acg agt gtt ctc gct tcc	8919
Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser	
2960 2965 2970	
cgt gag cgc act cct tat gac atc gtt ctc gag atg tgg gat gac	8964

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
 2975 2980 2985

cct acc aag gac cca ctc att cat gtc aaa ctt cag agc tcg ctg 9009
 Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
 2990 2995 3000

tat ggc cct gag cac gct cag gcc ttt gta gac cac ttt tct tca 9054
 Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
 3005 3010 3015

atc ctc act atg ttc tcg atg aac ccg gct ctg aag ttg gcc tag 9099
 Ile Leu Thr Met Phe Ser Met Asl Pro Ala Leu Lys Leu Ala
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<210> 44

<211> 3032

<212> PRT

<213> Penicillium citrinum

<400> 44

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
 1 5 10 15

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
 20 25 30

Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
 35 40 45

Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg

50 55 60
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
115 120 125

Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
130 135 140

Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
145 150 155 160

Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
165 170 175

Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
180 185 190

Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala

195

200

205

Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn

210

215

220

Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp

225

230

235

240

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu

245

250

255

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu

260

265

270

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn

275

280

285

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly

290

295

300

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His

305

310

315

320

Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala

325

330

335

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu

340

345

350

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr

355

360

365

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val

370

375

380

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro

385

390

395

400

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr

405

410

415

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn

420

425

430

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser

450

455

460

Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln

465

470

475

480

Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr

485

490

495

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
500 505 510

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
515 520 525

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
530 535 540

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
545 550 555 560

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
565 570 575

Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
580 585 590

Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
595 600 605

Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
610 615 620

Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu

625 630 635 640

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
 645 650 655

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
 660 665 670

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
 675 680 685

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
 690 695 700

Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
 725 730 735

Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
 740 745 750

Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
 755 760 765

His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys

770	775	780	
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala			
785	790	795	800
Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala			
	805	810	815
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val			
	820	825	830
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile			
	835	840	845
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp			
	850	855	860
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn			
865	870	875	880
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu			
	885	890	895
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val			
	900	905	910
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr			

915

920

925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
980 985 990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
995 1000 1005

Val Ala Gly Glu Arg Ala Ala Glu Val Gln Leu Leu Glu Ile Leu
1010 1015 1020

Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
1025 1030 1035

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp
1040 1045 1050

Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

1055	1060	1065
Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val		
1070	1075	1080
Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro		
1085	1090	1095
Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe		
1100	1105	1110
Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp		
1115	1120	1125
Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser		
1130	1135	1140
Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu		
1145	1150	1155
Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr		
1160	1165	1170
Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser		
1175	1180	1185
Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser		

1190	1195	1200
Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe		
1205	1210	1215
Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp		
1220	1225	1230
Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp		
1235	1240	1245
Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp		
1250	1255	1260
His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu		
1265	1270	1275
Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys		
1280	1285	1290
Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys		
1295	1300	1305
Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp		
1310	1315	1320
Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala		

1325	1330	1335
Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu		
1340	1345	1350
Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser		
1355	1360	1365
Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu		
1370	1375	1380
Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn		
1385	1390	1395
Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe		
1400	1405	1410
Gly Ser Ala Ile His Val Val Gln Asp Leu Val Ser Gln Ile Ala		
1415	1420	1425
His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr		
1430	1435	1440
Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe		
1445	1450	1455
Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys		

1460	1465	1470
Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu		
1475	1480	1485
Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro		
1490	1495	1500
His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser		
1505	1510	1515
Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys		
1520	1525	1530
Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro		
1535	1540	1545
Ala Arg Leu Ala Phe Ile Ser Gly Leu Phe Ala Asp Arg Trp Thr		
1550	1555	1560
Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp		
1565	1570	1575
Gln Trp Glu His Thr Leu Lys Arg Val Gly Phe Ser Gly Val Asp		
1580	1585	1590
Ser Arg Thr Leu Asp Arg Glu Asp Asp Leu Ile Pro Ser Val Phe		

1595

1600

1605

Ser Thr His Ala Val Asp Ala Thr Val Glu Arg Leu Tyr Asp Pro
1610 1615 1620

Leu Ser Ala Pro Leu Lys Asp Ser Tyr Pro Pro Leu Val Val Ile
1625 1630 1635

Gly Gly Glu Ser Thr Lys Thr Glu Arg Ile Leu Asn Asp Met Lys
1640 1645 1650

Ala Ala Leu Pro His Arg His Ile His Ser Val Lys Arg Leu Glu
1655 1660 1665

Ser Val Leu Asp Asp Pro Ala Leu Gln Pro Lys Ser Thr Phe Val
1670 1675 1680

Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu
1685 1690 1695

Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg
1700 1705 1710

Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln
1715 1720 1725

Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730	1735	1740
Asp Leu Gly Thr His Val Phe	Asp Val Asp Thr Val	Glu Asn Leu
1745	1750	1755
Asp Thr Lys Phe Phe Val Glu	Gln Leu Leu Arg Phe	Glu Glu Ser
1760	1765	1770
Asp Asp Gln Leu Leu Glu Ser	Ile Thr Trp Thr His	Glu Pro Glu
1775	1780	1785
Val Tyr Trp Cys Lys Gly Arg	Ala Trp Val Pro Arg	Leu Lys Gln
1790	1795	1800
Asp Ile Ala Arg Asn Asp Arg	Met Asn Ser Ser Arg	Arg Pro Ile
1805	1810	1815
Phe Gly Asn Phe Asn Ser Ser	Lys Thr Ala Ile Ala	Leu Lys Glu
1820	1825	1830
Ala Arg Gly Ala Ser Ser Ser	Met Tyr Tyr Leu Glu	Ser Thr Glu
1835	1840	1845
Thr Cys Asp Ser Leu Glu Asp	Ala Arg His Ala Gly	Lys Ala Thr
1850	1855	1860
Val Arg Val Arg Tyr Ala Leu	Pro Gln Ala Ile Arg	Val Gly His

1865	1870	1875
Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr		
1880	1885	1890
Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile		
1895	1900	1905
Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met		
1910	1915	1920
Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala		
1925	1930	1935
Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser		
1940	1945	1950
Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys		
1955	1960	1965
Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu		
1970	1975	1980
Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile		
1985	1990	1995
Arg Leu His Ala Lys Glu Thr Asp Ala Arg Leu Lys His Ser Leu		

2000	2005	2010
Pro Thr Asn Met Met Ala Phe Phe Asp Leu Ser Thr Asp Arg Thr		
2015	2020	2025
Ala Ala Gly Ile Thr Asn Arg Leu Ala Lys Leu Leu Pro Pro Ser		
2030	2035	2040
Cys Phe Met Tyr Ser Gly Asp Tyr Leu Ile Arg Ser Thr Ala Ser		
2045	2050	2055
Thr Tyr Lys Val Ser His Val Glu Asp Ile Pro Ile Leu Glu His		
2060	2065	2070
Ser Val Ala Met Ala Lys Asn Thr Val Ser Ala Ser Thr Val Asp		
2075	2080	2085
Asp Thr Glu Lys Val Ile Thr Ala Thr Gln Ile Leu Leu Pro Gly		
2090	2095	2100
Gln Leu Ser Val Asn His Asn Asp Gln Arg Phe Asn Leu Ala Thr		
2105	2110	2115
Val Ile Asp Trp Lys Glu Asn Glu Val Ser Ala Arg Ile Cys Pro		
2120	2125	2130
Ile Asp Ser Gly Asn Leu Phe Ser Asn Lys Lys Thr Tyr Leu Leu		

2135	2140	2145
Val Gly Leu Thr Gly Asp Leu Gly Arg Ser Leu Cys Arg Trp Met		
2150	2155	2160
Ile Leu His Gly Ala Arg His Val Val Leu Thr Ser Arg Asn Pro		
2165	2170	2175
Arg Leu Asp Pro Lys Trp Ile Ala Asn Met Glu Ala Leu Gly Gly		
2180	2185	2190
Asp Ile Thr Val Leu Ser Met Asp Val Ala Asn Glu Asp Ser Val		
2195	2200	2205
Asp Ala Gly Leu Gly Lys Leu Val Asp Met Lys Leu Pro Pro Val		
2210	2215	2220
Ala Gly Ile Ala Phe Gly Pro Leu Val Leu Gln Asp Val Met Leu		
2225	2230	2235
Lys Asn Met Asp His Gln Met Met Asp Met Val Leu Lys Pro Lys		
2240	2245	2250
Val Gln Gly Ala Arg Ile Leu His Glu Arg Phe Ser Glu Gln Thr		
2255	2260	2265
Gly Ser Lys Ala Leu Asp Phe Phe Ile Met Phe Ser Ser Ile Val		

2270	2275	2280
Ala Val Ile Gly Asn Pro Gly Gln Ser Asn Tyr Gly Ala Ala Asn		
2285	2290	2295
Ala Tyr Leu Gln Ala Leu Ala Gln Gln Arg Cys Ala Arg Gly Leu		
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Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala		
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Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg		
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Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile		
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Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn		
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Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp		

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Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile		
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Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp		
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Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val		
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Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln		
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Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser		
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Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala		

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Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg		
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Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met		
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Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu		
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Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg		
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Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile		
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Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln		
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Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly		
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Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys		
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Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe		
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Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu		
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Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg		
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Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val		
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Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly		
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Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln		
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His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu		
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Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala		
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Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu		

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Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp		
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Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu		
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Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser		
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Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile	
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Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro	
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Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys	
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Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly	
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Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu	
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Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val	
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Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr	
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Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser	
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Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser	
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Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn	
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Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg	
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Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala	
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Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala	
210 215 220	
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Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr	
225 230 235 240	
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Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe	
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Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu	
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Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg	
275 280 285	
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Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala	
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Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
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 His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
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Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln	
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Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg	
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Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp	
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Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg	
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Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly	
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Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp	
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His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln	
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Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly	
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Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His	
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Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His	
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Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg	
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Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His	
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Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly	
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Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu	
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Ser Tyr	Glu Asn Arg His Ile	Val His Pro Thr Thr	Leu Asp Ser	
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Gly Ile	Pro Val Ile Glu Ile	Glu Gly Leu Val Phe	Gln Ser Val	
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Gly Ser	Ser Phe Ser Asp Gln	Lys Ser Asp Ser Asn	Asp Thr Glu	
1280	1285	1290		

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Thr Thr	Arg Asp Gln Leu Asp	Leu Phe Phe Thr Phe	Gly Leu Leu	
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1610	1615	1620		
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Phe Asn	Gly Val Glu Leu Glu	Val Arg Asp Cys Glu	Asp Asp Glu	
1625	1630	1635		
ttt tac	atg atc agc aca atg	cta tcg acg gct aga	aaa gag aat	4959
Phe Tyr	Met Ile Ser Thr Met	Leu Ser Thr Ala Arg	Lys Glu Asn	
1640	1645	1650		
aca acc	ccg gat aca gtg gca	gaa tcg gag gtg ctt	ttg ctg cac	5004
Thr Thr	Pro Asp Thr Val Ala	Glu Ser Glu Val Leu	Leu Leu His	
1655	1660	1665		
gga gcg	ctc cga cct cct tca	tct tgg ctg gaa agt	ctc cag gca	5049
Gly Ala	Leu Arg Pro Pro Ser	Ser Trp Leu Glu Ser	Leu Gln Ala	
1670	1675	1680		
gca att	tgt gaa aag acc agt	tct agc cca tcg atc	aac gct ctg	5094
Ala Ile	Cys Glu Lys Thr Ser	Ser Ser Pro Ser Ile	Asn Ala Leu	
1685	1690	1695		

ggc gag gta gat acc act gga agg aca tgc att ttt ctt ggg gaa	5139
Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe Leu Gly Glu	
1700 1705 1710	
atg gag tcc tcg ctc ctt gga gag gtg gga agc gag acc ttc aaa	5184
Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu Thr Phe Lys	
1715 1720 1725	
tcc atc acc gcg atg ctg aat aac tgc aac gca ctt ctc tgg gtg	5229
Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu Leu Trp Val	
1730 1735 1740	
tct aga gga gca gcc atg agc tcc gag gat cca tgg aaa gct cta	5274
Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp Lys Ala Leu	
1745 1750 1755	
cat att ggt ctg ctg cgt acc atc cgc aac gaa aat aac ggg aag	5319
His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys	
1760 1765 1770	
gaa tat gta tcg ttg gat ctc gat cct tct cga aac gca tac acc	5364
Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr	
1775 1780 1785	
cac gag tcc ctg tat gct atc tgc aat atc ttc aat ggc cgc ctc	5409
His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu	
1790 1795 1800	
ggc gac ctt tcc gaa gac aag gag ttt gaa ttt gca gag aga aac	5454
Gly Asp Leu Ser Glu Asp Lys Glu Phe Glu Phe Ala Glu Arg Asn	
1805 1810 1815	
ggc gtc atc cac gta ccg cga ctt ttc aat gac ccg cac tgg aag	5499
Gly Val Ile His Val Pro Arg Leu Phe Asn Asp Pro His Trp Lys	
1820 1825 1830	

gac caa	gaa gcg gtt gag gtc	aca ctg cag ccg ttc	gag caa ccc	5544
Asp Gln	Glu Ala Val Glu Val	Thr Leu Gln Pro Phe	Glu Gln Pro	
1835	1840	1845		
ggg cgt	cgt ctg cgg atg gag	gtt gag acg cca ggg	ctc tta gac	5589
Gly Arg	Arg Leu Arg Met Glu	Val Glu Thr Pro Gly	Leu Leu Asp	
1850	1855	1860		
tcc ctg	caa ttt cga gac gac	gaa gga cgt gaa ggc	aag gat ctt	5634
Ser Leu	Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly	Lys Asp Leu	
1865	1870	1875		
ccg gat	gat tgg gta gaa atc	gaa ccc aaa gct ttc	ggg ctc aat	5679
Pro Asp	Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe	Gly Leu Asn	
1880	1885	1890		
ttt cgg	gat gtc atg gtt gcc	atg ggt caa ttg gag	gcc aac cgt	5724
Phe Arg	Asp Val Met Val Ala	Met Gly Gln Leu Glu	Ala Asn Arg	
1895	1900	1905		
gtg atg	ggc ttc gaa tgc gcc	gga gtg atc aca aag	ctc ggt gga	5769
Val Met	Gly Phe Glu Cys Ala	Gly Val Ile Thr Lys	Leu Gly Gly	
1910	1915	1920		
gct gct	gcc gct agc caa ggc	ctc aga tta ggg gac	cgc gta tgt	5814
Ala Ala	Ala Ala Ser Gln Gly	Leu Arg Leu Gly Asp	Arg Val Cys	
1925	1930	1935		
gca cta	ctg aaa ggc cat tgg	gcg acc aga aca cag	acg ccg tac	5859
Ala Leu	Leu Lys Gly His Trp	Ala Thr Arg Thr Gln	Thr Pro Tyr	
1940	1945	1950		
act aat	gtc gtc cgt att ccg	gac gaa atg ggc ttc	cca gaa gcc	5904
Thr Asn	Val Val Arg Ile Pro	Asp Glu Met Gly Phe	Pro Glu Ala	
1955	1960	1965		

gct tcg gtc ccc ctg gct ttc act acc gca tat att gcg ctt tat	5949
Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr	
1970 1975 1980	
acc acg gca aag cta cga cga ggc gaa aga gtc ttg atc cac agt	5994
Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser	
1985 1990 1995	
gga gct gga ggc gtc ggt caa gca gcg atc att ttg tcc cag ctt	6039
Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu	
2000 2005 2010	
gcg ggt gcc gag gtc ttc gtc aca gcg gga act caa gcc aag cgt	6084
Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg	
2015 2020 2025	
gac ttt gtc ggc gat aaa ttc ggc atc aat ccg gat cat atc ttc	6129
Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe	
2030 2035 2040	
tcg agc agg aat gac tta ttc gtc gac ggc atc aaa gcc tac acg	6174
Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr	
2045 2050 2055	
ggc gga ctt ggc gtt cat gtc gtt cta aac tca ttg gca ggt caa	6219
Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln	
2060 2065 2070	
ctc ctc caa gca agc ttt gac tgc atg gcc gaa ttc ggc aga ttt	6264
Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe	
2075 2080 2085	
gtt gag att gga aaa aag gac ctg gag caa aac agc aga ctt gac	6309
Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp	
2090 2095 2100	

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Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu	
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ctc tcg tgg caa aga gcc aaa agt gaa gaa gta tcc gaa gcg ttg	6399
Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu	
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aac cat gtc aca aaa ctc ctc gag aca aaa gcg att ggc ttg att	6444
Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile	
2135 2140 2145	
ggt cca atc cag cag cac tcc ttg tca aac atc gag aag gcc ttc	6489
Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe	
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cgt acg atg cag agt ggt cag cat gtt ggc aaa gtt gtg gtc aat	6534
Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn	
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gta tct ggg gac gaa ctg gtc cca gtc ggc gat gga ggg ttc tcg	6579
Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser	
2180 2185 2190	
ctg aag ctg aag cct gac agt tct tac cta gtt gct ggt ggg ctg	6624
Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu	
2195 2200 2205	
ggg gga att gga aag cag atc tgt cag tgg ctt gtt gat cat ggc	6669
Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly	
2210 2215 2220	
gcg aag cac ttg att atc cta tcg aga agt gca aag gcc agt cca	6714
Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro	
2225 2230 2235	

ttc ata acc agc ttg caa aat caa cag tgc gct gtc tat cta cac	6759
Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His	
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gca tgt gac atc tca gat caa gat cag gtc acc aag gtg ctc cgg	6804
Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg	
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Leu Cys Glu Glu Ala His Ala Pro Pro Ile Arg Gly Ile Ile Gln	
2270 2275 2280	
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Gly Ala Met Val Leu Lys Asp Ala Leu Leu Ser Arg Met Thr Leu	
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Asp Glu Phe Asn Ala Ala Thr Arg Pro Lys Val Gln Gly Ser Trp	
2300 2305 2310	
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Tyr Leu His Lys Ile Ala Gln Asp Val Asp Phe Phe Val Met Leu	
2315 2320 2325	
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Ser Ser Leu Val Gly Val Met Gly Gly Ala Gly Gln Ala Asn Tyr	
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2345 2350 2355	
gcc cat ggc atg ccg gct gtc acc att gac ttg ggc atg gtc aag	7119
Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys	
2360 2365 2370	

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Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg	
2375 2380 2385	
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Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met	
2390 2395 2400	
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Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro	
2405 2410 2415	
tca cct ccc gca gct gtg gtt aca gga atc aac aca tcc ccg ggt	7299
Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly	
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Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val	
2435 2440 2445	
gga ctt aaa tac cgc caa gtc ctt cat gca gac caa tcc ttt gtc	7389
Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val	
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Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser	
2465 2470 2475	
agg gtc acc tct cac gac gag gcc att tct atc gtc ctc aaa gca	7479
Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala	
2480 2485 2490	
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Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp	
2495 2500 2505	

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 2525 2530 2535

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 Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
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<211> 2563

<212> PRT

<213> *Penicillium citrinum*

<400> 46

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Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
 35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
115 120 125

Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
130 135 140

Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145 150 155 160

Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
165 170 175

Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
180 185 190

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
195 200 205

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
210 215 220

Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
225 230 235 240

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
245 250 255

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
260 265 270

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
275 280 285

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
290 295 300

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305 310 315 320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
325 330 335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
340 345 350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
355 360 365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
370 375 380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
385 390 395 400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
405 410 415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
420 425 430

Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
435 440 445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
450 455 460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
465 470 475 480

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
485 490 495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
500 505 510

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg
515 520 525

Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly
530 535 540

Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn
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Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp
565 570 575

His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln
580 585 590

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp
595 600 605

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn
610 615 620

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu
625 630 635 640

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser
 645 650 655

His Ser Ser Gly Glu Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser
 660 665 670

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr
 675 680 685

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly
 690 695 700

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu
705 710 715 720

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr
 725 730 735

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
 740 745 750

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
 755 760 765

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
770 775 780

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
785 790 795 800

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
805 810 815

Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
820 825 830

Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
835 840 845

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850 855 860

Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
865 870 875 880

Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
885 890 895

Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
900 905 910

Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
915 920 925

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
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Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
1040 1045 1050

Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
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Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
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Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
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Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
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Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn
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Asp Leu Trp Glu Ser Leu His Ala Asn Gly Ile Cys His Gly Pro
1130 1135 1140

Ile Phe Gln Asn Ile Gln Arg Ile Gln Asn Asn Gly Gln Gly Ser
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Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His
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Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser
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Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg
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Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn
1325 1330 1335

Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln
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His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val
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Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys
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Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile
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Ala Ile Cys Glu Lys Thr Ser Ser Ser Pro Ser Ile Asn Ala Leu
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His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys
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Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr
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His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu
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Gly Asp Leu Ser Glu Asp Lys Glu Phe Glu Phe Ala Glu Arg Asn
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Gly Val Ile His Val Pro Arg Leu Phe Asn Asp Pro His Trp Lys
1820 1825 1830

Asp Gln Glu Ala Val Glu Val Thr Leu Gln Pro Phe Glu Gln Pro
1835 1840 1845

Gly Arg Arg Leu Arg Met Glu Val Glu Thr Pro Gly Leu Leu Asp
1850 1855 1860

Ser Leu Gln Phe Arg Asp Asp Glu Gly Arg Glu Gly Lys Asp Leu
1865 1870 1875

Pro Asp Asp Trp Val Glu Ile Glu Pro Lys Ala Phe Gly Leu Asn
1880 1885 1890

Phe Arg Asp Val Met Val Ala Met Gly Gln Leu Glu Ala Asn Arg
1895 1900 1905

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly
1910 1915 1920

Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys
1925 1930 1935

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr
1940 1945 1950

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala
1955 1960 1965

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr
1970 1975 1980

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1985 1990 1995

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Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
2135 2140 2145

Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
2150 2155 2160

Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
2165 2170 2175

Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
2180 2185 2190

Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
2195 2200 2205

Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
2210 2215 2220

Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro
2225 2230 2235

Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His
2240 2245 2250

Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg
2255 2260 2265

Leu Cys Glu Glu Ala His Ala Pro Pro Ile Arg Gly Ile Ile Gln
2270 2275 2280

Gly Ala Met Val Leu Lys Asp Ala Leu Leu Ser Arg Met Thr Leu
2285 2290 2295

Asp Glu Phe Asn Ala Ala Thr Arg Pro Lys Val Gln Gly Ser Trp
2300 2305 2310

Tyr Leu His Lys Ile Ala Gln Asp Val Asp Phe Phe Val Met Leu
2315 2320 2325

Ser Ser Leu Val Gly Val Met Gly Gly Ala Gly Gln Ala Asn Tyr
2330 2335 2340

Ala Ala Ala Gly Ala Phe Gln Asp Ala Leu Ala His His Arg Arg
2345 2350 2355

Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys
2360 2365 2370

Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg
2375 2380 2385

Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met
2390 2395 2400

Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro
2405 2410 2415

Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly
2420 2425 2430

Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val
2435 2440 2445

Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val
2450 2455 2460

Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser
2465 2470 2475

Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala
2480 2485 2490

Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp
2495 2500 2505

Met Ser Ser Ser Lys Asn Leu Ala Gly Val Gly Val Asp Ser Leu
2510 2515 2520

Val Ala Ile Glu Leu Arg Asn Trp Ile Thr Ser Glu Ile His Val
2525 2530 2535

Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
 2540 2545 2550

Leu Val Glu Leu Val Val Ala Lys Cys Ser
 2555 2560

<210> 47

<211> 1557

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1557)

<400> 47

atg ctc ggc cag gtt ctt ctg acc gtc gaa tcg tac caa tgg gta tcg 48
 Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
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acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc 96
 Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala
 20 25 30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa 144
 Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
 35 40 45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg 192
 Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
 50 55 60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc 240

Tyr	Gly	Pro	Ser	Trp	Ile	Glu	Ala	Trp	Phe	Ser	Lys	Asn	Asp	Lys	Pro		
65					70				75					80			
ctg	cgc	ttc	att	gtt	gat	tcc	ggc	tat	tgc	acc	atc	ctc	cca	tcg	tcc		288
Leu	Arg	Phe	Ile	Val	Asp	Ser	Gly	Tyr	Cys	Thr	Ile	Leu	Pro	Ser	Ser		
			85					90					95				
atg	gcc	gac	gag	ttt	cgg	aaa	atc	aaa	gat	atg	tgc	atg	tac	aag	ttt		336
Met	Ala	Asp	Glu	Phe	Arg	Lys	Ile	Lys	Asp	Met	Cys	Met	Tyr	Lys	Phe		
			100					105					110				
ttg	gcg	gat	gac	ttt	cac	tct	cat	ctc	cct	gga	ttc	gac	ggg	ttc	aag		384
Leu	Ala	Asp	Asp	Phe	His	Ser	His	Leu	Pro	Gly	Phe	Asp	Gly	Phe	Lys		
			115					120					125				
gaa	atc	tgc	cag	gat	gca	cat	ctt	gtc	aac	aaa	gtt	gtt	ttg	aac	cag		432
Glu	Ile	Cys	Gln	Asp	Ala	His	Leu	Val	Asn	Lys	Val	Val	Leu	Asn	Gln		
	130						135				140						
tta	caa	acc	caa	gcc	ccc	aag	tac	aca	aag	cca	ttg	gct	acc	ttg	gcc		480
Leu	Gln	Thr	Gln	Ala	Pro	Lys	Tyr	Thr	Lys	Pro	Leu	Ala	Thr	Leu	Ala		
	145					150				155				160			
gac	gct	act	att	gcc	aag	ttg	ttc	ggt	aaa	agc	gag	gag	tgg	caa	acc		528
Asp	Ala	Thr	Ile	Ala	Lys	Leu	Phe	Gly	Lys	Ser	Glu	Glu	Trp	Gln	Thr		
				165				170					175				
gca	cct	gtc	tat	tcc	aat	gga	ttg	gac	ctt	gtc	aca	cga	aca	gtc	aca		576
Ala	Pro	Val	Tyr	Ser	Asn	Gly	Leu	Asp	Leu	Val	Thr	Arg	Thr	Val	Thr		
			180					185					190				
ctc	att	atg	gtc	ggc	gac	aaa	atc	tgc	cac	aat	gag	gag	tgg	ctg	gat		624
Leu	Ile	Met	Val	Gly	Asp	Lys	Ile	Cys	His	Asn	Glu	Glu	Trp	Leu	Asp		
			195					200					205				
att	gca	aag	aac	cat	gcc	gtg	agt	gtg	gcg	gta	caa	gct	cgc	caa	ctt		672

Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu	
210 215 220	
cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg	720
Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro	
225 230 235 240	
caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att	768
Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile	
245 250 255	
gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg	816
Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala	
260 265 270	
aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa	864
Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu	
275 280 285	
gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct	912
Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala	
290 295 300	
atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc	960
Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala	
305 310 315 320	
ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa	1008
Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln	
325 330 335	
gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg	1056
Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu	
340 345 350	
ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc	1104

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
 355 360 365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc 1152
 Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
 370 375 380

act cta tcc aat ggc ctc ttc att ccg aag ggc gag ttg gcc gct gtg 1200
 Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
 385 390 395 400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat 1248
 Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
 405 410 415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc 1296
 Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
 420 425 430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc 1344
 Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
 435 440 445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc 1392
 Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
 450 455 460

aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta 1440
 Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
 465 470 475 480

cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg 1488
 Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
 485 490 495

cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg 1536

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
500 505 510

ctc cct cat gac cgg tgc taa
Leu Pro His Asp Arg Cys
515

1557

<210> 48
<211> 518
<212> PRT
<213> *Penicillium citrinum*

<400> 48

Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
1 5 10 15

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala
20 25 30

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
35 40 45

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
50 55 60

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro
65 70 75 80

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

85

90

95

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe
100 105 110

Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
115 120 125

Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
130 135 140

Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
145 150 155 160

Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
165 170 175

Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
180 185 190

Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
195 200 205

Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
210 215 220

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro

225 230 235 240

Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
 245 250 255

Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
 260 265 270

Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
 275 280 285

Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
 290 295 300

Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
305 310 315 320

Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
 325 330 335

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
 340 345 350

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
 355 360 365

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile

370

375

380

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
465 470 475 480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
485 490 495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
500 505 510

Leu Pro His Asp Arg Cys

515

<210> 49

<211> 3522

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(3522)

<400> 49

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Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met
1 5 10 15

aat cag cag cac cct cta cgc tcg gga aat cgg gca ttg acc tcc aca 96
Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
20 25 30

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt 144
Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
35 40 45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa 192
Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
50 55 60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc 240
Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65 70 75 80

tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc 288
Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
85 90 95

tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc	336
Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe	
100 105 110	
aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt	384
Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val	
115 120 125	
gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta	432
Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu	
130 135 140	
tct gtg att gac ctt ccc tca acg teg agc cct tta acc gcc tat tcg	480
Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser	
145 150 155 160	
aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa	528
Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu	
165 170 175	
ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa	576
Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys	
180 185 190	
ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg	624
Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met	
195 200 205	
aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac	672
Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His	
210 215 220	
gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc	720
Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu	
225 230 235 240	

gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc	768
Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe	
245 250 255	
gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tgc aag gtt tgg ctg	816
Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu	
260 265 270	
gct aca agc gtc ctt ttg tgc tca aca ttt gcc ttt ctc ctc ggt ctc	864
Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu	
275 280 285	
gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc	912
Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser	
290 295 300	
gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc	960
Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile	
305 310 315 320	
act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc	1008
Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro	
325 330 335	
cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt	1056
Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser	
340 345 350	
acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat	1104
Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn	
355 360 365	
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct	1152
Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala	
370 375 380	

gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca 1200
Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385 390 395 400

ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg 1248
Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
405 410 415

att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac 1296
Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
420 425 430

atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag 1344
Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
435 440 445

agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg 1392
 Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
 450 455 460

ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg 1440
Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465 470 475 480

atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc 1488
Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
485 490 495

ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg 1536
Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp
500 505 510

acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc 1584
Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
515 520 525

aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg	1632
Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly	
530 535 540	
cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa	1680
Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu	
545 550 555 560	
cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat	1728
Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr	
565 570 575	
gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat	1776
Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp	
580 585 590	
ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct	1824
Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala	
595 600 605	
ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct	1872
Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro	
610 615 620	
aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa	1920
Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu	
625 630 635 640	
agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc	1968
Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu	
645 650 655	
caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac	2016
Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp	
660 665 670	

agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag	2064
Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys	
675 680 685	
 cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca	2112
Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr	
690 695 700	
 caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg	2160
Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu	
705 710 715 720	
 aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg	2208
Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly	
725 730 735	
 tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt	2256
Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val	
740 745 750	
 cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt	2304
Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser	
755 760 765	
 atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc	2352
Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg	
770 775 780	
 gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct	2400
Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro	
785 790 795 800	
 gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att	2448
Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile	
805 810 815	

cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc	2496
Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly	
820 825 830	
agt aag gca atc aac ctc ggt ggc ggt gcc gtg aca gtc ctg act ggc	2544
Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly	
835 840 845	
gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga	2592
Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg	
850 855 860	
gct ggt gct gct aag atc tgg ctc gat tgg gac gtc ggc cag acc gta	2640
Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val	
865 870 875 880	
atg aaa gaa gcc ttc aat tca acc agc aga tti gcg cgc tta caa agt	2688
Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser	
885 890 895	
atg cgg aca act atc gcc ggt act cac tta tat att cga ttt aag act	2736
Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr	
900 905 910	
act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag	2784
Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu	
915 920 925	
cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat	2832
His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn	
930 935 940	
att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct	2880
Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala	
945 950 955 960	

ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc	2928
Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile	
965 970 975	
ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc	2976
Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser	
980 985 990	
atg gtt cag ctc aac ata tcg aaa aat ctg att ggg tcc gct atg gct	3024
Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala	
995 1000 1005	
ggc tca gtt ggc ggc ttc aac gcc caa gct gcc aat ctt gcg gca	3069
Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala	
1010 1015 1020	
gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag	3114
Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu	
1025 1030 1035	
agc gct aac tgc atc act ctc atg aac aat ctt cgc gga tcg ctt	3159
Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu	
1040 1045 1050	
caa atc tct gtc tcc atg ccg tct att gag gtt gga acg ttg ggc	3204
Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly	
1055 1060 1065	
ggg ggt acg att ctg gag ccc cag ggc gca atg ctt gac atg ctt	3249
Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu	
1070 1075 1080	
ggg gtc cgc gga tca cac ccg acc act ccc ggt gag aat gca cgt	3294
Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg	
1085 1090 1095	

caa ctt gcg cgc atc atc gga agc gct gtt ttg gct ggg gag ctc 3339
Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu
1100 1105 1110

tcg cta tgt gct gcc cta gcc gcc ggt cac ctg gtc aag gcg cac 3384
Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His
1115 1120 1125

atg gcg cac aac cgt tct gcc ccg gca tct tca gcc cct tct cga 3429
Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg
1130 1135 1140

agt gtc tcc ccg tca ggc gga acc agg aca gtc cct gtt cct aac 3474
Ser Val Ser Pro Ser Gly Gly Thr Arg Thr Val Pro Val Pro Asn
1145 1150 1155

aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc 3519
Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg
1160 1165 1170

tga 3522

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Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr

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25

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Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
35 40 45

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
50 55 60

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65 70 75 80

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
85 90 95

Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
100 105 110

Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
115 120 125

Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
130 135 140

Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145 150 155 160

Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu

165 170 175
Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
180 185 190

Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
195 200 205

Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
210 215 220

Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225 230 235 240

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile

305

310

315

320

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
355 360 365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
370 375 380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385 390 395 400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
405 410 415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
420 425 430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
435 440 445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu

450 455 460
Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465 470 475 480

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
 485 490 495

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp
 500 505 510

Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
 515 520 525

Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly
 530 535 540

Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu
545 550 555 560

Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr
 565 570 575

Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp
 580 585 590

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala

595

600

605

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro
610 615 620

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu
625 630 635 640

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu
645 650 655

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp
660 665 670

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys
675 680 685

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr
690 695 700

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
705 710 715 720

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
725 730 735

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740

745

750

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
755 760 765

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
770 775 780

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
785 790 795 800

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
805 810 815

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
820 825 830

Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
835 840 845

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
850 855 860

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
865 870 875 880

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser

885

890

895

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
900 905 910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu

1025	1030	1035
Ser Ala Asn Cys Ile Thr Leu	Met Asn Asn Leu Arg	Gly Ser Leu
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Gln Ile Ser Val Ser Met Pro	Ser Ile Glu Val Gly	Thr Leu Gly
1055	1060	1065
Gly Gly Thr Ile Leu Glu Pro	Gln Gly Ala Met Leu	Asp Met Leu
1070	1075	1080
Gly Val Arg Gly Ser His Pro	Thr Thr Pro Gly Glu	Asn Ala Arg
1085	1090	1095
Gln Leu Ala Arg Ile Ile Gly	Ser Ala Val Leu Ala	Gly Glu Leu
1100	1105	1110
Ser Leu Cys Ala Ala Leu Ala	Ala Gly His Leu Val	Lys Ala His
1115	1120	1125
Met Ala His Asn Arg Ser Ala	Pro Ala Ser Ser Ala	Pro Ser Arg
1130	1135	1140
Ser Val Ser Pro Ser Gly Gly	Thr Arg Thr Val Pro	Val Pro Asn
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aaaccgcacc tgtctattcc

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ctttgtgggtt ggatgcatac

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end C1
